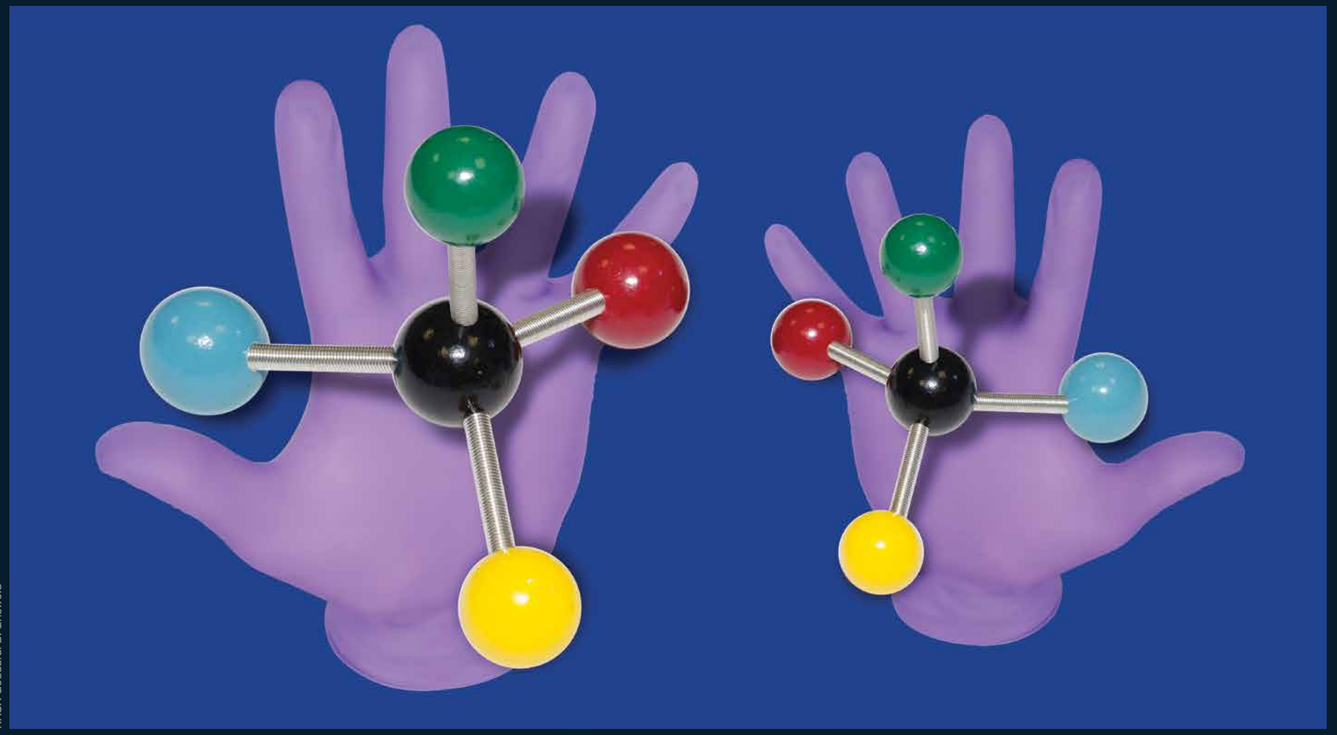
STATION 07 Goddard Initiatives

Mirror-Image Molecules; Left-Handed Life

Amino acid molecules exist in two mirror-image forms, like your hands. Chemistry usually makes these two forms in equal amounts, but life on Earth uses mostly the “left-handed” type to build proteins.

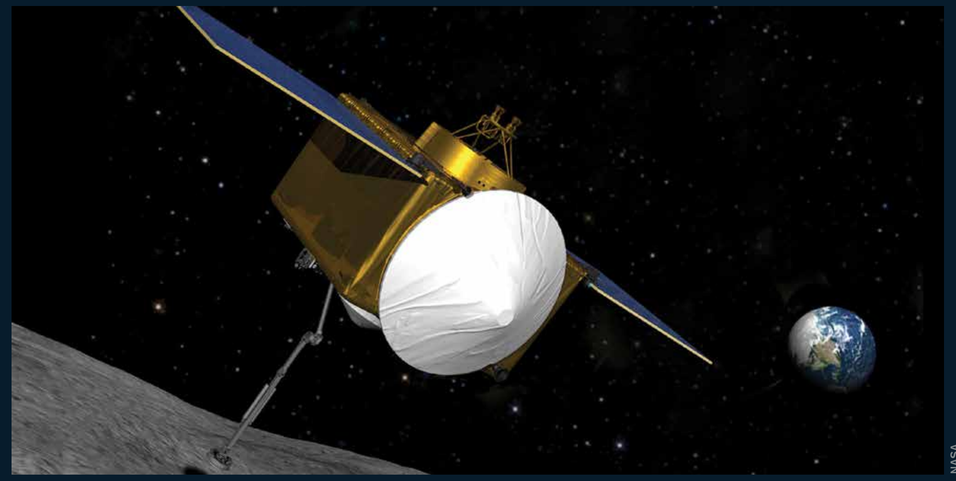
Why? This is a great mystery in science, and meteorites might hold the answer. Some meteorites have more left-handed amino acid molecules than right-handed ones. Scientists are working to understand how this happened, and whether meteorites delivered extra left-handed amino acids to the early Earth. Maybe the first life on Earth used the left-handed molecules delivered by meteorites!



NASA Goddard/B. Griswold

AMINO ACID’S HANDEDNESS: The two mirror-image forms of amino acid molecules are like your hands – they can’t be rotated or flipped to line up with each other. A right hand won’t fit into a left-handed glove, and right-handed amino acids don’t fit into life’s left-handed proteins.

Clues from Pristine Samples



NASA

MISSION TO A CARBONACEOUS ASTEROID: In 2019, OSIRIS-REx will collect pristine material from asteroid 1999 RQ36 and return it to Earth for study in terrestrial laboratories at Goddard and elsewhere.

Goddard scientists identified the amino acid glycine in samples returned from comet Wild-2 by the Stardust spacecraft.

OSIRIS-REx will return samples of a carbonaceous asteroid for similar study.

DID YOU KNOW?

Sample return missions bring pieces of other Solar System bodies to Earth. This material is untouched by Earth’s contaminating environment, and so preserves a true record of its history. Scientists who were not yet born when Apollo astronauts walked the Moon are now studying the lunar rocks brought back to Earth.